MAYO CLINIC LABORATORIES

Test Definition: VITA

Vitamin A, Serum

Overview

Useful For

Diagnosing vitamin A deficiency or toxicity

Monitoring vitamin A therapy

Method Name

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Patient Preparation:

1. Fasting: 12 hours, required; infants should have specimen collected before next feeding

2. Patient **must not** consume any alcohol for 24 hours before specimen collection.

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)

Collection Container/Tube:

Preferred: Red top

Acceptable: Serum gel

Submission Container/Tube: Plastic vial

Specimen Volume: 0.5 mL serum

Collection Instructions: Within 2 hours of collection, centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send a General Request (T239) with the specimen.

Specimen Minimum Volume

Serum: 0.25 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	28 days	
	Ambient	28 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

The level of vitamin A in the plasma or serum is a reflection of the quantities of vitamin A and carotene (provitamin A) ingested and absorbed by the intestine (carotene is converted to vitamin A by intestinal absorptive cells and hepatocytes).

Vitamin A plays an essential role in the function of the retina (adaptation to dim light), is necessary for growth and differentiation of epithelial tissue, and is required for growth of bone, reproduction, and embryonic development. Together with certain carotenoids, vitamin A also plays a critical role in immune function, with deficiency associated with increased susceptibility and severity of some infectious diseases.

Degenerative changes in eyes and skin are commonly observed in vitamin A deficiency. In developing countries, vitamin A deficiency is the principal preventable cause of blindness. Poor adaptation of vision to darkness (nyctalopia, night blindness) is an early symptom that may be followed by degenerative changes in the retina. Severe or prolonged deficiency leads to xerophthalmia, which can result in dry eye, corneal ulcers, Bitot spots, keratomalacia, and ultimately blindness. Skin changes such as dry skin, generalized xerosis, and phrynoderma are commonly observed in conjunction with vision disorders caused by vitamin A deficiency.

Vitamin A in excess can be toxic. In particular, chronic vitamin A intoxication is a concern in normal adults who ingest more than 15 mg per day and children who ingest more than 6 mg per day of vitamin A over a period of several months. Manifestations are various and include dry skin, cheilosis, glossitis, vomiting, alopecia, bone demineralization and pain, hypercalcemia, lymph node enlargement, hyperlipidemia, amenorrhea, and features of pseudotumor cerebri with increased intracranial pressure and papilledema. Liver fibrosis with portal hypertension may also result. Congenital malformations, like spontaneous abortions, craniofacial abnormalities, and valvular heart disease have been described in pregnant women taking vitamin A in excess. Consequently, in pregnancy, the daily dose of vitamin A should not exceed 3 mg.

Reference Values

0-6 years: 11.3-64.7 mcg/dL
7-12 years: 12.8-81.2 mcg/dL
13-17 years: 14.4-97.7 mcg/dL
> or =18 years: 32.5-78.0 mcg/dL

Interpretation

The World Health Organization recommendations supplementation when vitamin A levels fall below 20.0 mcg/dL.

Severe deficiency is indicated at levels less than 10.0 mcg/dL. There is no widely accepted serum vitamin A level associated with toxicity.

The rare occurrence of low Vitamin A and E levels might correlate with potential deficiency and investigation of potential fat malabsorptions should be considered.

Cautions

Acute alcohol ingestion may result in increased serum vitamin A levels. Therefore, patients should abstain from alcohol for 24 hours prior to collection.

Testing of nonfasting specimens or the use of vitamin supplementation can result in elevated serum vitamin concentrations. Reference values were established using specimens from individuals who were fasting.

Clinical Reference

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6. Penniston KL, Tanumihardjo SA. The acute and chronic toxic effects of vitamin A. Am J Clin Nutr. 2006;83(2):191-201. doi:10.1093/ajcn/83.2.191
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9. Wong CY, Chu DH. Cutaneous signs of nutritional disorders. Int J Womens Dermatol. 2021;7(5Part A):647-652. doi:10.1016/j.ijwd.2021.09.003

Performance

Method Description

Deuterated vitamin A (d6-all-trans retinol) is added to serum as an internal standard. Vitamin A (all-trans retinol) and the deuterated internal standard are extracted from the specimens and analyzed by liquid chromatography tandem mass spectrometry.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed
Monday through Friday, Sunday

Report Available
2 to 5 days

Specimen Retention Time
14 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
84590

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
VITA	Vitamin A, S	2923-1

Result ID	Test Result Name	Result LOINC® Value
7597	Vitamin A	2923-1